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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,822	10/11/2001	Ryoichi Morimoto	018976-203	7801

7590 07/25/2002

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EXAMINER
PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 07/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/973,822	MORIMOTO ET AL.	
	Examiner	Art Unit	
	Ishwar (I. B.) Patel	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-8 is/are pending in the application.

4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 7-8 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 04 April 2002 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 & 3
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *copy of page 608.02 of MPEP* .

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on April 24, 2002. These drawings are not approved.

(a). The removal of cross hatching, as marked, in the top view, figure 1A, 2A, 3A-B, 4A-B, 5A, 6A-B-C, 7A, are correct but the cross hatching in cross section views, Figure 1B, 2B, 5B and 7B for the pads and the solder bumps are to be retained.

(b). Cross hatching for bumps and solder to be added in figure 7B.

(c). Cross hatching for substrate in all the above cross sections may be used as shown on 608.02 of the MPEP, either section of synthetic resin / plastic or electrical insulation.

(d). Shading for X-ray examination and transparent plan view may be suitably used.

a copy of page 608.02 of MPEP is attached for ready reference.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (US Patent 5,889,326), in view of Hiruta, US Patent No. 5,998,861.

Regarding claim 7, Tanaka discloses a connection structure comprising:

a substrate having a surface and substrate-side pad electrodes formed on the substrate surface (circuit board 5 with substrate pad 6, see figure 3A, column 3, line 25-35);

a surface-mount component having a surface and component-side pad electrodes formed on the surface, the surface being opposed to the substrate with each component-side pad electrode opposed to one of the substrate-side pad electrodes (semiconductor chip 1 with pad 2, see figure 3A, column 3, line 25-35);

wherein the substrate-side pad electrodes are arranged inside a component-corresponding region, the length of each of the substrate-side pad electrodes being larger than that of the corresponding component-side pad electrode (see figure 2, column 3, line 25-55), and

wherein each of the component-side pad electrodes is connected to the corresponding substrate-side pad electrode by a solder which has flowed between the component-side pad electrodes and the substrate-side pad electrodes by melting of the solder bump (Solder bump 7, see figure 3A and 3B), but

fail to explicitly disclose the solder bump formed on the component side pad. The solder bump of Tanaka is on the substrate side pad. However the solder bump on the component side pad is known in the art. The bump to be provided on the substrate or component will depend upon various parameters such as the ease with which it can be prepared either on the component or on the substrate, but it is important to have reliable and strong connections of the component to the substrate. Further, the applicant is not claiming any specific advantage of forming the solder bump only on the component side. Hiruta discloses such solder bump formed on the component side pad. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the assembly of Tanaka with solder bump formed on the component pad, as taught by Hiruta, in order to have reliable and strong electrical and mechanical connection with relative convenience of manufacturing.

Regarding claim 8, the modified assembly of Tanaka further discloses the width of each of said component-side pad electrode is set to be larger than the width of each of said substrate-side pad electrodes, see Tanaka figure 3A.

Response to Arguments

4. Applicant's arguments with respect to claims 7-8 have been considered but are moot in view of the new ground(s) of rejection. In addition, Banerji et al., US patent No.

5,311,059, Ohuchi et al., US Patent No. 6,130,480 are disclosing such solder bump on the components.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
July 18, 2002

DAVID L. TALBOTT
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800